

TNG Banking on the Value in Vanadium, Titanium

Paul Burton, CEO of TNG Limited, tells Alan about the company's plans to produce and extract vanadium and titanium at a new integrated plant at Mount Peake in the Northern Territory.

By [Alan Kohler](#) · 21 Oct 2021

Paul Burton is the CEO of TNG Limited, which has a vanadium, titanium and iron deposit in Northern Territory, just north of Alice Springs. It's very interesting and this stock looks terribly undervalued, to be honest, it's got a market cap of \$100 million and the feasibility study they did a couple of years ago which hasn't yet been updated, but is going to be, put a net present value on the operation of \$2.8 billion, close to \$3 billion. Vanadium these days is also being used in batteries so it's become a bit of a green/environmental product as well as is traditionally used to strengthen steel.

They've done a joint venture with a Malaysian company that's going to produce hydrogen and they're going to use the vanadium in batteries to produce hydrogen, so it's kind of interesting in that respect as well and obviously, titanium oxide is used as a pigment and they've got some reasonably high quality iron ore as well, iron oxide, it'll be – ferric oxide or something. Anyway, I think you should take a listen to this, it's well worth a listen. Paul Burton, CEO of TNG Limited.

 Eureka Report



Paul Burton - TNG

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Paul, I always start these interviews talking about cash, how much have you got in the bank at the moment?

We've got about \$8 million left in the bank and that's plenty for us to get through into the next couple of quarters.

From what I can gather, it doesn't cost very much to keep the lights on and the staff employed, does it? How much are you spending per month?

Yeah, that's correct. Those overheads, we're probably trying to keep it down below half a million a quarter. We focus very much on the overheads to keep them down and all the money that goes into getting their project up and running.

The capex for Mount Peake, you've got down at \$824 million, where are you going to get that from?

We mandated the German KfW IPEX-Bank, that's the German government-supported export credit bank, principally because we have a big German engineering group that's doing the work for us and there'll be quite a bit of German content in the overall project. They've offered to syndicate the debts, look after the lead arranging of the debts for up to \$600 million...

How much debt would there be, \$600 million?

\$US600 million, which we won't need all of that, and then we've also got KPMG Corporate Finance to look after the structure of the equity side.

Are you going to retain 100 per cent of the equity?

Yeah. There's a potential for us to have a strategic partner become involved, that is one of the avenues that we're going to pursue but otherwise we will

that is one of the avenues that we're going to pursue, but otherwise, we will retain 100 per cent.

That \$824 million includes now building the processing facilities plants onsite at Mount Peake between Alice Springs and Tennant Creek, right?

That's absolutely correct, yeah. In fact, when we did the risk and completed the study of moving the process plant and having a fully integrated facility at the mine site, we expect the capex probably to reduce because the costs of

construction there are noticeably lower in Darwin where you've got everything's got to be built to withstand Category 5 cyclones. We estimate there's going to be a significant saving there.

How much of a saving?

Well, it's going to be in the hundreds of millions, we think at this stage, but we've just appointed Clough Engineering and they're going to be going through the detailed layout and once they've completed that, we should have an updated financial model for all of that.

That was a big deal, wasn't it, the decision to move the processing plant from Darwin to Mount Peake was a big deal, wasn't it? In fact, did it happen not because you wanted to but because you had to?

We could have pursued Darwin and carried on, but it was clear that some of the risks of permitting have remained, even if we'd gone along with all of the directions the EPA had provided to us, they were not insurmountable, but there was a significant time constraint on them so that we would be looking at least a 12-months' delay there, so that was a risk for us and then on no surety of being permitted. When we looked at the Mount Peake site, there was clearly a case to be made for us to have an integrated site, having resolved the two hurdles that we had that prevents that originally, which was enough gas and enough water. Then the Mount Peake site looked like the best option. It was a big decision and it wasn't taken lightly. We had our full engineering team and some external consultants as well, advising.

We've always had different plans and plan Bs just in case there is a showstopper in any one area. Mount Peake was always an option, as was a site overseas and also down in South Australia we looked at as well. But this is

a clear pathway now and it makes a lot of sense and we've got a lot of support even from the EPA for this direction.

Is it going to cost more to get the stuff to the port? Presumably, you'll have to truck it, wouldn't you?

Well, there's a rail siding in the actual overall plan at the moment. We were going to rail up to Darwin, that was the concentrate. But now we can still rail up the final value-added product...

It'll be rail...?

Yeah.

Is it an existing rail that you're using?

Yes, it's only 60-70 kilometres from our mine site, that's the...

The Ghan? You're not going to get in the way of the Ghan, are you?

[Laughs] No, it's a very under-utilised railway, the NT-Alice Springs one, so no, there's no problem there at all. We've engaged with One Rail on this throughout the project and they're aware, they'll be supplying us the trainset, etcetera, for that. There'll be some passing loops clearly that need to be put on the rail, but that's the plan.

Tell us about the deposit, when did you find it and what were you looking for?

We originally discovered this in late 2008. It was actually a nickel target and we were drilling for nickel sulphides and went through over 150 metres of magnetite...

Magnetite being iron ore?

Yeah, that's right, it's actually a titanomagnetite, so it's titaniferous, means it's got titanium within the magnetite and these are common sources of vanadium. We had them assayed and it was very significant grades of titanium and vanadium in the magnetite and we just took it step by step from there. My background as a geologist has always been in gold, precious metals and base metals, diamonds, and we knew very little about vanadium and titanium at that time so we just put it all in the hands of our metallurgical

statement at that time, so we just put it all in the hands of our metallurgical group here, seeing how we could extract the maximum value. Then we got Snowdons to do the resource and it was quite a large deposit. It's quite unique that it's flat lying and very shallow – it's around about 10 to 15 metres beneath the sand cover, so very low strip ratio.

So, it's an open cut with a low strip ratio?

Yeah, it'll be an open cut mine and it's about two kilometres long and about 600–700 metres wide, and it goes down about 150 metres of economic resource, it's a very large deposit.

Is it open at either end or is it basically self-contained?

It's pretty much self-contained where the resource pinches off to the north and it finishes at the southern end. It's what they call a sill, so it's been an intrusive sill that's come out into a horizontal fashion. It's about 50 kilometres from the main Alice Springs to Darwin highway, 20 kilometres from a gas pipeline and as I say, about 70 kilometres from the railway. Good infrastructure very close by which really gave it the economic potential.

I take it you didn't find any nickel?

No, those targets weren't mineralised at all. There's a whole number of targets in there, it's a good area for it and but unfortunately not.

You also developed your own process for the product called TIVAN, which I guess must stand for Titanium and Vanadium, is that right?

That's correct, yes.

Tell us about why and how you did that?

Most of these titaniferous deposits are mined for vanadium and traditionally and historically the way they've extracted the vanadium is through what they call a pyrometallurgical process, which is essentially very, very intensive on the energy demand and it's all about heat and blast furnace type processing, in which the vanadium is extracted and the titanium and the iron effectively form a slag that goes onto the waste heap.

And it's a slag because it's so hot?

Yeah, and they can't do anything with it, that's the important point. There's value there but because they've extracted the vanadium in that way they

value there but because they've extracted the vanadium in that way, they can only sell one product and that's the vanadium pentoxide. We wanted to extract maximum value and as I said, we mentioned this to our metallurgical consultants, METS here in Perth, and they had been investigating a wet chemical method, so it's a hydrogeochemical method of processing to extract the vanadium, the titanium and the iron from these types of deposits. We essentially funded that and ended up with a patent that allowed us to extract the vanadium and then you get left behind the titanium and the iron for which they're in oxide form and come out at very high grades. Although we were initially aiming at just extracting the vanadium in high purity, in high recoveries, during this method, the two bi-products as it were, the titanium-dioxide and the iron-oxide, came out at such a high purity that they became commercial products in their own right. By default, we managed to actually become a multi-commodity deposit.

So, are you saying that was an accident?

Yeah, we never thought that the titanium dioxide and the iron would be at such high a grades as they are, allowing the distinct value-add. We wanted to recover them, we wanted to bring them out but we didn't think that they would have that same value. That's because they have the high recoveries and the high purity that we're able to now get those very high values which is why we get such a very robust financial metrics on the project. We'll get to those in a moment.

You ended up with vanadium-pentoxide, right?

That's right.

Do you sell the vanadium-pentoxide itself and how much does it sell for?

Yeah, it's a funny market, the vanadium pentoxide. It sells for around about \$US10 a pound, the way the market works, and it's essentially used in the steel industry. But yes, we have an offtake agreement for 100 per cent of that with two groups, one is a Korean converter, so they take the vanadium-pentoxide and they convert it into ferrovanadium, which is then used in car manufacture and all sorts of high quality steels and fabrics. The other one is with Gunvor, one of the larger Swiss trading groups, but we deal with the group in Singapore who have a vanadium desk. That's all of that tied up. It's a good market...

How long have you sold it for?

We haven't sold it yet. No, we're not in production yet.

But you've got an offtake agreement, right?

Oh yes, sorry, that's for life of mine.

Goodness me, and is it take or pay?

It's take or pay and the mine life at the moment is about 35 years.

How much have you sold? I mean, what's the deal? Can you tell us? What sort of revenue are we talking about?

The overall revenue of the project is extremely strong and 40 per cent of it comes from the vanadium-pentoxide, 50 per cent comes from the titanium pigment. The way it works on the vanadium-pentoxide is there is a floor price that we have in our offtake agreement that protects us our cost of production. Our cost of production is extremely low because it's a hydro-chemical method, so we're the lowest cost producer globally on this, which is important, so our margins are always very strong. The vanadium markets, there's spot pricing for the vanadium market but what tends to happen is the producers of vanadium deal directly with the buyers and they lock in a price. The price is sort of reviewed annually and we're just going to have a discount to the previous year's price, that's how that system works.

Vanadium's also been used in large stationary flow batteries. What's going on there? Are you going to be able to sell into that market? I can't remember the name of the buyer...?

Gunvor?

Gunvor, yeah, is that what that potential sale is about?

They're very interested, interestingly enough, in the vanadium redox batteries and we've long had a business plan to roll out the vanadium redox batteries. We've got a good plan for that through the...

You mean to make the batteries?

No, we won't make them, we actually have a company in Singapore that can supply the batteries for us, but what we can make is the vanadium

electrolytes, VE, from the vanadium-pentoxide to go into the batteries. We've done that already, we actually used to be engaged very heavily with Sumitomo Electric and we produced a vanadium electrolyte for their batteries to their exacting very, very specific requirements. We know we can do it and we can do it relatively cheaply, so the idea is that we would definitely have a vanadium electrolyte facility. At this stage, we're looking at having that in Darwin, to then have a showcase battery.

Because that's what's needed in that whole market, Alan, really. They've been around for a long time, vanadium redox batteries, but they haven't really taken off yet because no one's actually focusing on bringing them into production. There's big ones being produced in China, the Japanese are quite advanced in it, but they haven't rolled out yet. We think when they do it's going to be extremely interesting because there just won't be enough vanadium in the market at the moment to produce enough vanadium electrolyte for all these batteries.

But how will you make vanadium electrolyte if you've sold all your vanadium to these two offtake agreements?

In both of them, they're classed as vanadium product, so if they have a market for vanadium electrolyte and they want us to supply that, then we can do that, that's the plan.

If you were able to vanadium electrolyte in Darwin, it would be part of your existing offtake agreement?

It absolutely could be, yeah, they're all classed as a vanadium derivative or a vanadium product, that's correct.

Is there a market price for vanadium electrolyte?

There are groups in China that can make vanadium electrolyte and they do tend to try and sell it, it's a very opaque market there. The key, I think, is to be able to be vertically integrated. If you have your own deposit and you have your own process where you can make vanadium-pentoxide and then you have the process that you can make vanadium electrolyte, it doesn't really matter what it costs you to do that because it's going to go into a battery

that someone will either buy or they'll lease from a utility perspective, because the vanadium electrolyte, unusually for most elements, retains its electric charge forever. It doesn't reduce over time like other batteries, like lithium for example, so the vanadium electrolyte will outlast the actual battery itself probably. They last for many, many, many years.

You've got a deal with a Malaysian company to do with hydrogen. Is that connected to the vanadium electrolyte and the vanadium redox battery situation?

Not directly. That joint venture, they approached us because they wanted to really get into...

You probably should name the company, who is it?

AGV, they're Kuala Lumpur-based and they're focusing on a green hydrogen strategy for Malaysia and they've developed a process which they've trademarked as high sustain and I actually know both of the directors of that company and they were interested in what we were doing here with respect to...

They want to make green hydrogen, which basically means hydrogen made with renewable energy, right?

That's correct, yeah, it has to be green. Yes, so we got to talking about the advantages/disadvantages of vanadium redox batteries because they needed to have a large storage ability, they produce their energy and they needed to be able to store it, so that's where that comes in. More particularly for us, we wanted to have a very green signature on our project. Both down at the mine site we wanted to have a hydrogen source and you've got plenty of room out there for a green facility. They have the technology, so if we wanted to joint venture with them, they'll be for two aspects. One, to have a green hydrogen facility at the mine site to help part of the power or all of the power requirements; and also a production facility in Darwin to produce green hydrogen for export and also for the local market.

Hang on, so it's a 50-50 JV with this company in Malaysia to build two hydrogen factories, is that right?

Yeah, the first one is going to be in Darwin itself, which will be focusing on

producing about 100,000 tonnes of green hydrogen, that's the plan that we're discussing with them and the government at the moment.

And that's for export?

For export and the local market, depending on what the requirements are. The NT government is very keen to have a sort of a hydrogen hub in Darwin and this fits into that profile that they're trying to develop there. Yes, but we hope to have a green hydrogen facility down at the mine site as well and a vanadium redox battery, we'll be as green as anything if we can, down there.

So would this all take place the same time as you digging the mine and the processing plant?

The actual mine development, we have to finish the engineering and there's probably going to be about 18 months of construction time. The proposed scope for the green hydrogen facility is being worked out now. It's a potential that that could come on stream a bit earlier than the production down at the mine site. But yes, the actual timing of that, we're still working through.

Right, so the plan is to have at Mount Peake, the mine processing plant, a big vanadium redox battery and a hydrogen plant?

Well, if we can produce the green hydrogen effectively, then that's certainly something that we'll have as part of our power requirements down there.

What would you be making the hydrogen from, water?

From water, yeah. We're going to have a water recycling plant...

There's no water down there.

Yeah, there's two big aquifers...

Oh, is that so?

Yeah, one that we discovered for the mine and then there's another one further to the west that's much larger and there's certainly enough water in there for everything required at the mine site and the processing, but that was one of the hurdles that I mentioned a bit earlier, we didn't think there was enough water there for both processing and the mine sites initially, that's why the process plant was put offsite. But during the environmental work that we did in Darwin we had to in the end incorporate a water recycling

that we did in Darwin, we had to in the end incorporate a water recycling plant so that we reduced our water consumption significantly and by doing so we therefore also ticked the box for Mount Peake and saying, well if we've got a water recycling plant down there, we do have enough water for everything. That was one of the main hurdles previously.

Right, there you go. Let's talk about the financial models. Have you got a full feasibility study done by now?

Yeah, feasibility study was completed in 2017 and updated again in 2019.

So it's, at this point, two years old?

That's correct. I mean, nothing's changed except for now we'll be doing a fresh one because of the change in location of the process plants. There's a lot of logistical savings and cost savings. But yes, the markets have only got stronger, the exchange rate's worked in our favour. We didn't want to keep putting out new financial models all the time, this one's fine and it shows a very strong project.

What's the internal rate of return and the net present value shown in the feasibility study?

The NPV is just short of \$3 billion Australian and the IRR is at 33 per cent, it's quite strong and that was done, as I say, at a bit of a higher exchange rate. We estimate that every time the exchange rate drops 10 per cent, we add on about 20 per cent to the NPV, so it's quite significantly affected by the exchange rate.

So, \$3 billion roughly NPV and your market cap is about \$100 million. What, the market doesn't believe it, is that the problem?

I think it's a big capex figure so there obviously is some scepticism, I think, on the funding of that, but we're very confident on that regard. I think it's also, the fact that this is not traditional commodities and so, not everyone is aware of vanadium and the titanium pigment is very much a chemical area, so it's non-traditional but a very, very profitable process that we have. I think as we move towards getting the finance in place and as I say, we've got a very strong bank supporting us and KPMG Corporate Finance, good plans from an equities point of view, and once we do move into that project finance, I think you will then start to see the value being recognised in the company.

But, to date, we've had two years of feed, it was delayed a bit because of the COVID situation. Feed is the final engineering study that was being done by the SMS Group in Germany and news flow is not very strong when you're going through a feed and then engineering, so I think our share price has just been moving tracking sideways, but now we're at the pointy end of the project, if you like, where we can get the final permitting done and then move straight into project finance and then construction.

When does your models have you producing vanadium and titanium and iron?

We're going to have about an 18-month construction period...

Starting when?

Let's call it 24 months. Next year we have to make the final investment decision in the second half of the year and then we should commence construction at the end of next year or early 2023. That will be in production then in '25.

You've also got 20 per cent of a nickel-cobalt deposit, I think you call it, it's under care and maintenance isn't it?

That's right.

It's called Cawse project?

That's correct, it's the Cawse Extended Project just outside of Kalgoorlie, that was a joint venture that we originally had with Norilsk Nickel who had it in operation. It then went onto care and maintenance when they had that fire and gas issue in WA up around the mines and it's been on care and maintenance since. We hold 20 per cent, just a free carriage, which we can convert to 2 per cent NSR, and we understand that the current owners who are a private company are looking to go into production again next year, so there's a significant amount of nickel and cobalt up there. Cobalt obviously is a very interesting commodity these days with batteries.

Could you sell that to help finance Mount Peake?

We certainly could and it'll be interesting to see what revenue stream that

we certainly could and it'll be interesting to see what revenue stream that might produce as well, but yes, absolutely. That's a strategic asset that we've hung onto.

How much do you think it's worth?

Well, there's 100 million tonnes up there, so depending how you want to calculate it, it's worth tens of millions of dollars to us.

Very good. Well, it's been fascinating to talk to you, thank you very much, Paul.

Pleasure, likewise, Alan, thanks very much.

That was Paul Burton, the CEO of TNG Limited.

 For more information on [TNG Limited \(TNG\)](#), please [click here](#)

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